Energising Coils with a Polyswitch

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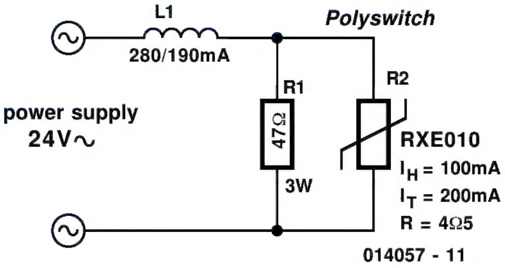
Despite the fact that fuses have had almost exclusive reign during much of the previous century, the impact made by resetable fuses such as the Polyswitch series from Raychem over the last decade is clearly noticeable. The resistance of these components (which have a positive temperature coefficient) increases suddenly when the temperature is raised. They may be used as a replacement for a fuse, with the convenience that it is no longer necessary to replace this fuse once it has done its job.

The application possibilities for the Polyswitch are diverse and include batteries, power supplies of various types, as well as small motors, transformers and loudspeakers.



In the circuit shown here, a Polyswitch is used to reduce the current through a 24 V electromagnet from 280 mA to 190 mA (holding current). The coil is part of an electrically operated valve which forms part an automatic sprinkler installation, but this method is universally applicable. After determining, by either empirical or theoretical method, the value of the series resistor, a shunt in the shape of a Polyswitch fuse is connected in parallel with it.

In our case, we needed a 47 Ω, 3 W resistor and a Polyswitch type RXE 010. The latter remains passive with currents up to 100 mA ($I_H = 0.1$ A) and becomes high impedance when the current is greater than 200 mA ($I_T = 0.2$ A). The resetable fuse remains in the 'open' position as long as the power supply is present. The Polyswitch device suggested here requires about 15 s before tripping. This allows the electric valve sufficient time to operate.

The author made use of an RXE 010 from Raychem (R = 4.5 Ω). The MF-R010 from Bourns has the same characteristics.

More information about these Polyswitches may be obtained from the manufacturers' web sites,

www.raychem.com and www.bourns.com.

A PDF (Adobe Acrobat Reader) datasheet for the Polyswitch family can be found at

www.bourns.com/pdf/MFR.pdf.

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